127 - PHYSICAL FITNESS IN INDIGENOUS POPULATIONS: A REVIEW STUDY

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INTRODUCTION

Physical fitness is used to study the health status of human beings. According to Bouchard, Shepherd & Stephens (1993), fitness is influenced by hereditary and environmental factors and is based on the following components: i) morphological; ii) muscular:; iii) motor; iv) cardio respiratory; v) metabolic component.

Although physical fitness related to health involves several variables, in terms of indigenous populations these studies show greater concern with morphological characteristics, especially body composition, given the deficient nutritional status of these populations. Withal, it was noted that studies of this nature present a variety of terms, such as physical growth (Gugelmin, Santos & Leite, 2001) and body composition (Fagundes et al, 2004).

Results obtained in physical fitness tests can be compared to reference values. According to Morrow et al (2003), the same result in a test can be satisfactory for one reference and unsatisfactory for another. Consequently, test data interpretation can vary significantly according to the adopted reference. To evaluate morphological characteristics that indicate weight, height and skin folds, we have the international references CDC (Center for Disease Control and Prevention)/NCHS (National Center for Health Statistics) and Marcondes et al (1999) as a national reference.

Protocols are applied in different cultural contexts, including indigenous populations. Currently, there are 230 indigenous populations that speak 180 languages distributed throughout various Brazilian states, except Piauí and Rio Grande do Norte (Instituto Socioambiental, 2009). According to the demographic census of 2000, the indigenous population consists of 701,462 individuals, representing an increase in relation to the census of 1991 that reported a population of 294,128. This evidently characterizes a demographic recovery process that, among other factors, was caused by vegetative growth and the "ethnic valorisation" phenomenon based on the acknowledgement of these populations as indigenous, as well as more reliable sources of information on these populations (Azevedo, 2008). The peculiarities of each ethnicity are unquestioned so it is important to verify the protocols used for studies involving physical fitness of these populations.

Considering that physical fitness is viewed differently by authors of this field, there is a wide range of comparative references and tests and measurements used to evaluate physical fitness. Consequently, the aim of this study is to analyse studies involving physical fitness of indigenous populations, namely in relation to adopted terms, measurements, procedures, reference indexes and values, and cultural adaptation of indigenous populations.

METHODOLOGY

This study is based on analysis and interpretation of data obtained from bibliographical research. Research comprised the study of articles in journals in digital archives available on the internet that were published in the last 10 years. This study method allowed access and manipulation of relevant information for reflection on the physical fitness of indigenous populations.

The search strategy was based on related keywords: indigenous physical fitness; indigenous body composition; indigenous physical growth; indigenous anthropometry; indigenous weight; indigenous height.

Following bibliographical surveying, the material was studied using an index card system and synthesis of the main concepts presented in each studied text. All the material was analyzed to obtain an overview of the studied subject, followed by a critical evaluation of relevance and value of the studied content.

TERMS USED IN THE STUDY OF PHYSICAL FITNESS IN INDIGENOUS POPULATIONS

The terms used in studies of physical fitness in indigenous populations are physical growth (Gugelmin, Santos & Leite, 2001; Coimbra Jr. et al, 2007), body composition (Fagundes et al, 2004) and anthropometry (Escobar, Santos & Coimbra Jr., 2003; Gugelmin & Santos, 2006; Leite, Santos & Coimbra Jr., 2007; Sampei et al, 2007; Menegolla et al, 2006; Pícoli, Carandina & Ribas, 2006; Gugelmin & Santos, 2001; Ribas et al, 2001; Fagundes & Fagundes-Neto, 2002; Castro et al, 2010; Kühl, Leite & Bastos, 2009; Salvo, et al, 2009). The aims of these studies are related to the health of indigenous populations, namely their nutritional status due to the severity of this problem in these populations during the study period.

The terms used in these studies involving physical fitness of indigenous populations are varied and most frequently based on anthropometry followed by physical growth. The other terms related to morphology and body composition were stated in only one study. The use of these terms related to physical fitness is based on the health of indigenous peoples, more specifically on a study of the nutritional status of these populations. Although these terms are different, studies are based on the evaluation of similar issues.

MEASUREMENTS AND PROCEDURES USED IN THE STUDY OF PHYSICAL FITNESS IN INDIGENOUS POPULATIONS

Measurements considered in the study of physical fitness in indigenous populations are weight, height, circumference and skin folds. Most studies used the measurements of weight and height (Menegolla et al, 2006; Pícoli, Carandina & Ribas, 2006; Ribas et al 2001; Fagundes & Fagundes-Neto, 2002; Morais et al, 2003; Orellana et al, 2006; Kühl, Leite & Bastos, 2009; Mondini et al, 2007; Gugelmin, 2001; Capelli & Koifman, 2001; Escobar, Santos & Coimbra Jr., 2003; Leite, Santos & Coimbra Jr. 2007), followed by studies that adopted measurements of weight, height, skin folds and circumference (Gugelmin, Santos & Leite, 2001; Coimbra Jr et al, 2006; Gugelmin & Santos. 2006; Sampei et al, 2007), weight, height and circumference (Castro et al, 2010; Salvo et al, 2009) and, lastly, weight, height and skin folds (Fagundes et al, 2004).

Most studies adopted procedures recommended by the World Health Organization (Coimbra Jr et al, 2006; Pícoli, Carandina & Ribas, 2006; Castro, et al, 2010; Orellana et al, 2006; Kühl, Leite & Bastos, 2009; Leite, Santos & Coimbra Jr., 2007; Salvo et al, 2009), followed by studies that did not specify references of recommended techniques (Fagundes & Fagundes-Neto,

2002; Mondini et al 2007; Gugelmin & Santos, 2001; Capelli & Koifman, 2001; Escobar, Santos & Coimbra Jr., 2003). The most cited authors are Lohman and collaborators who, in 1988, published the book Anthropometric Standardization Reference Manual (Gugelmin, Santos & Leite, 2001; Gugelmin & Santos. 2006; Fagundes et al, 2004, Ribas et al 2001), Ministry of Health (Menegolla et al, 2006), Jelliffe (1968) (Morais et al, 2003) and World Health Organization (Sampei et al, 2007).

Gugelmin & Santos (2001) briefly explain the procedure for data collection in the following way: "the individuals were weighed and measured with light clothing and barefoot". Capelli & Koifman (2001) do not explain the procedures for data collection. Similarly, Escobar, Santos & Coimbra Jr. (2003) do not explain the procedure but they state that, "anthropometric data were collected in the scope of a broader study...".

Most studies specified the reference of adopted procedures and that these procedures are internationally recognized. Some studies, however, did not mention references or procedures for data collection, which hinders interpretation of results.

REFERENCE INDEXES AND VALUES ADOPTED IN THE STUDY OF PHYSICAL FITNESS OF INDIGENOUS POPULATIONS

Chart 1 shows the variables, indexes and references used in the studies. For the physical fitness evaluation related to health, all authors used weight and height, being that most studies adopted the indexes: Height/Age; Weight/Age; Weight/Height, to evaluate children, with z-score cut-off - 2 and + 2, as recommended by the World Health Organization, and the reference population adopted by the National Center for Health Statistics (NCHS). Gugelmin, Santos & Leite (2001) used the abovementioned references and results of other studies involving indigenous populations to compare with their results.

Another adopted index was the body mass index, with percentage cut-off for children and adolescents of up to 5 for low weight, 85 to 95 for overweight, and above 95 for obese, according to the NCHS reference. In studies with adults, the authors used cut-off indicated by the World Health Organization. Some authors did not cite references and simply indicated cut-off, whereas the study of Capelli & Koiffman (2001) cited another reference.

In addition to weight and height variables, some studies included waist circumference to evaluate adults (Gugelmin & Santos, 2006; Castro et al, 2010; Salvo et al, 2009), skin folds (Sampei et al, 2007) to evaluate adolescents and skin folds (Fagundes et al, 2004) to evaluate children.

Although z-score cut-off is not commonly used to evaluate indigenous populations, recommendations of the World Health Organization indicate that low height should be evaluated with criteria. Low height for age (- 2 standard deviation of NCHS/WHO reference): "shortness" or "stunting". "Shortness" is the descriptive definition of low height for the age. This term does not imply that an individual is short and can reflect both normal variation and a pathological process. "Stunting", which can be interpreted as a height deficit, is another commonly adopted term used to indicate that low height is pathological, reflecting a process of growth deficit as a result of sub-optimal health or nutritional status. In less developed areas where the prevalence of low height is substantial, it can be safely assumed that children are "stunted". However, when the prevalence of low height for age is not significant (the individual is close to the expected level), or a large number of children with low height are genetically small, it is inappropriate to assume that children are "stunted" (WHO, 1995).

Chart 1. Variables, indexes and references used in the studies.

	Variables		Indexes/reference				BMI/References		
Author/year	**W**	**H**	**HA**	**WA**	**WH**	**RN**	**PRI**	**V**	**WHO**
Gugelmin, Santos & Leite (2001)	x	x	x	x	x	x			
Coimbra Jr. et al (2006)	x	x	x		x	x	x	x	X
Escobar, Santos, Coimbra Jr. (2003)	x	x	x	x		x			
Gugelmin & Santos (2006	x	x							X
Leite, Santos & Coimbra Jr. (2007)	x	x	x	x	x	x			X
Sampei et al (2007)	x	x					x	x	
Menegolla et al (2006)	x	x		x	x	x			
Capelli & Koifman (2001)	x	x			x	x		x	
Fagundes et al (2004)	x	x		x	x	x			
Ribas et al (2001)	x	x		x	x	x			
Marais et al (2003)	x	x	x	x	x				
Castro et al (2010)	x	x	x	x		x	x	x	X
Orellana et al (2006)	x	x	x	x	x	x			
Kuhl, Leite & Bastos (2009)	x	x	x	x	x	x			
Mondini et al (2007)	x	x	x			x			
Salvo et al (2009)	x	x					x		

Key: W (weight), H (height), HA (height/age), WA (weight/age), WH (weight/height), RN (NCHS reference/ z-score), BMI (body mass index), PRI (classification according to BMI/NCHS), V (classification according to BMI), WHO (classification/World Health Organization).

CULTURAL ADAPTATION OF PROTOCOLS FOR INDIGENOUS POPULATIONS

Cultural adaptation of protocols or references was not detected in studies involving indigenous peoples. Menegolla et al (2006) reveal that, although some authors question adaptation of international reference curves, such as those of the NCHS, for indigenous populations claiming anthropometrics specificities of these populations, the World Health Organization recommends the use of international standards for the nutritional evaluation of children around the world.

The WHO recommends that anthropometric data of children should be compared to curves of a reference population. The most widely adopted curves are those of the NCHS. In an extensively cited study, Habicht et al (1974) compared

anthropometric data of pre-school students in several countries and concluded that, while the weight and height variation ranged from 12 to 30% among the less favoured children from a social and economical standpoint, the range was only 3-6% among more privileged children.

FINAL CONSIDERATIONS

The study of physical fitness in indigenous populations predominately focuses on the morphological component, which is found in literature under different terms given that physical fitness translated from English can refer to different terminologies. Measurements and procedures adopted in the study of physical fitness in indigenous populations are varied, while adopted reference indexes and values are all recommendations of the World Health Organization. Cultural adaptation of protocols to indigenous peoples was not detected given that more privileged populations in terms of nutritional status should be used as reference, which does not seem to be the case in these populations.

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PHYSICAL FITNESS IN INDIGENOUS POPULATIONS: A REVIEW STUDY

ABSTRACT

The aim of this study is to investigate studies involving physical fitness of indigenous populations. This bibliographical study is based on the analysis of articles published in the last 10 years available on the internet from digital journals of the Virtual Health Library (BIREME) and the Scientific Electronic Library Online (SciELO). The terms used in these studies involving physical fitness of indigenous populations are varied and most frequently based on anthropometry followed by physical growth. The measurements used in the study of physical fitness in indigenous peoples are weight, structure, circumference and skin folds, being that most studies are based on weight and height measurements. Most studies adopted the procedures recommended by the World Health Organization. The most widely adopted reference values are recommended by the World Health Organization (WHO), based on the reference population of the National Center for Health Statistics (NCHS). Studies did not include cultural adaptations in terms of protocols or references in studies involving indigenous populations, as recommended by the WHO.

KEYWORDS: indigenous, physical fitness, anthropometry.

APTITUDE PHYSIQUE DES PEUPLES INDIGÈNES: RÉVISION D'ÉTUDES

RÉSUMÉ

Cette recherche prévoyait d'analyser les études portant sur l'aptitude physique des peuples indigènes. Il s'agit d'une recherche bibliographique qui se base sur l'étude d'articles de journaux numériques provenant de la Bibliothèque Virtuelle de la Santé (BIREME) et de la Scientific Electronic Library (SciELO) disponibles sur internet et mis en ligne au cours des 10 dernières années. Les termes utilisés dans cette étude portant sur l'aptitude physique des peuples indigènes varient, il est souvent question d'anthropométrie, terme le plus fréquemment utilisé, et de croissance physique. Les mesures utilisées dans cette étude portent sur le poids, la taille, le tour de taille et l'épaisseur cutanée. Il convient de préciser que la majorité des études tiennent seulement compte du poids et de la taille. Dans la plupart des cas, les procédés se basent sur les procédés recommandés par l'Organisation Mondiale de la Santé. De même, les valeurs référentielles les plus utilisées obéissent aux recommandations de l'Organisation Mondiale de la Santé (OMS) qui se base sur la population référencée par le National Center for Health Statistics (NCHS). Conformément aux recommandations de l'OMS, cette expertise ne tient pas compte des adéquations culturelles relatives aux protocoles ou aux références mentionnés dans les études portant sur les peuples indigènes.

MÓT-CLÉ : indigènes, aptitude physique, anthropométrie.

APTITUD FÍSICA EN PUEBLOS INDÍGENAS: UN ESTUDIO DE REVISIÓN

RESUMEN

Esta investigación tuvo como objetivo analizar los estudios involucrando la aptitud física en pueblos indígenas. Se caracterizó por ser bibliográfica, teniendo como base el estudio de artículos en periódicos de las bases digitales de la Biblioteca Virtual en Salud (BIREME) y la Scientific Eletronic Library Online (SciELO) disponibles en Internet y publicados en los últimos 10 años. Los términos utilizados en los estudios involucrando la aptitud física en pueblos indígenas son diversos, siendo la antropometría el más utilizado, seguido de crecimiento físico. Las medidas utilizadas en el estudio de la aptitud física en pueblos indígenas son peso, estatura, circunferencias y pliegues cutáneos, siendo que la mayoría de los estudios utilizan las medidas de peso y estatura. Los procedimientos utilizados en su mayoría son los recomendados por la Organización Mundial de Salud. Los valores de referencia más utilizados son los recomendados por la Organización Mundial de Salud (OMS), teniendo como población de referencia la del National Center for Health Statistics (NCHS). No fueron verificadas adecuaciones culturales en lo que se refiere a los protocolos o informes en estudios involucrando a los pueblos indígenas, visto las recomendaciones de la OMS.

PALABRA CLAVE: indígena, aptitud física, antropometría.

APTIDÃO FÍSICA EM POVOS INDÍGENAS: UM ESTUDO DE REVISÃO

RESUMO

Esta pesquisa teve como objetivo investigar os estudos envolvendo a aptidão física em povos indígenas. Caracterizou-se por ser bibliográfica, tendo como base o estudo de artigos em periódicos das bases digitais da Biblioteca Virtual em Saúde (BIREME) e Scientific Eletronic Library Online (SciELO) disponíveis na internet e publicados nos últimos 10 anos. Os termos utilizados nos estudos envolvendo a aptidão física em povos indígenas são diversos, sendo a antropometria o mais utilizado, seguido de crescimento físico. As medidas utilizadas no estudo da aptidão física em povos indígenas são peso, estatura, circunferências e dobras cutâneas, sendo que a maioria dos estudos utilizam as medidas de peso e estatura. Os procedimentos utilizados em sua maioria são aqueles recomendados pela Organização Mundial de Saúde. Os valores de referência mais utilizados são os recomendados pela Organização Mundial de Saúde (OMS), tendo como população de referência a do National Center for Health Statistics (NCHS). Não foram verificadas adequações culturais no que se refere aos protocolos ou referências em estudos envolvendo os povos indígenas, visto as recomendações da OMS.

PALAVRAS-CHAVE: indígena, aptidão física, antropometria.